ANALYTICAL APPROXIMATIONS

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Analytical Approximation

Chi-Square Integral: To better than .0003 over

$0 \leq x \leq \infty$ for $m = 8$,

$$F_m(m+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}}\, dt$$

$$\doteq 1 - \frac{.4335}{\left[1+.05696x+.003877x^2+.0001708x^3\right]^4} .$$

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Analytical Approximation

Chi-Square Integral: To better than .00035 over

$0 \leq x \leq \infty$ for $m = 9$,

$$F_m(m+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} \, dt$$

$$\doteq 1 - \frac{.4373}{\left[1+.05337x+.003539x^2+.0001564x^3\right]^4} .$$

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Analytical Approximation

Chi-Square Integral: To better than .00035 over

$0 \leq x \leq \infty$ for $m = 10$,

$$F_m(m+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.4405}{\left[1+.0504x+.003234x^2+.0001462x^3\right]^4}.$$

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Analytical Approximation

Chi-Square Integral: To better than .0022 over $0 \leq x \leq 10$ for $m = 10$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq .00016341x^5 - .000041766x^6 + .0000038242x^7 - .00000012258x^8 \; .$$

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Analytical Approximation

Chi-Square Integral: To better than .0016 over

$0 \leq x \leq 9$ for $m = 9$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq .00060373x^{9/2} - .00016347x^{11/2}$$

$$+ .000016152x^{13/2} - .00000056547x^{15/2}.$$

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